COLLABORATION FACTORS AND QUALITY OF LEARNING EXPERIENCE ON INTERACTIVE MOBILE ASSISTED SOCIAL E-LEARNING

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ABSTRACT
This study (n=52) examined mobile assisted in-class course using collaborative learning theories over an 18-week semester in a college level course. A self-evaluation survey containing 50 closed-ended items with two open-ended questions about participants' collaboration experience through the mobile techs was conducted during the last week of the semester. Results from the quantitative data based on linear regression analysis revealed that individual accountability significantly predicted quality of teamwork learning experience in an interactive mobile assisted social e-learning (iMASE) module, as did social skills, quality of feedback, and perceived ability. Finally, based on the qualitative data, perspectives on past experiences, interaction with peers and instructor of the learning community, prompt feedback behavior, authentic group activities were examined and analyzed based on grounded theory. The findings provide useful information for educators or curriculum designers to consider of significant factor when implementing mobile tech as part of the course curriculum in order to rich the quality of learning.
Keywords: mobile techs, social networking apps, cooperative learning, social constructivist

1. INTRODUCTION

A new generation of mobile wirelessly networked technologies, such as Web 3.0 technologies or social media has led to an increasingly prevalent among college students. Learning to learn may be considered to have greater impact on future experiences than the mere construction of domain-specific knowledge itself. Consequently, the learning environment is no longer considered to be the precondition for but an outcome of learning. The new wave of Internet technologies is contributing to new forms of learning in this generation of learners. "Many schools are beginning to implement sound and effective mobile device policies and frameworks so that teachers, administrators, and most importantly, students have 24/7 access to recourses and a 21st century learning environment" (Pierco et al., 2011, p. 3). According to O'Reilly (2005), innovative curriculum integrated with multimedia and technology involvement has changed the ways people create in terms of how teachers teach, and how students learn. Anderson (2008) also indicates "education is not only about access to content. The greatest affordance of the Web for education use is the profound and multifaceted increase in communication and interaction capabilities that is provides" (p. 42). In today's collaborative Web, users can share information and create new knowledge collaboratively. Pedagogically, engaging learners in cooperative learning involving cooperatively working in groups to achieve their shared/common goal or helpfully completing group projects is one of the major pathways to scaffold learning development (Effandi & Zanaton, 2007; Johnson & Johnson, 1994) as learning is a social activity (Chen & Bryer, 2012; Vygotsky, 1978).

Without a doubt, applications of social software technology support constructivist. In this way, the learner develops collaboration, negotiation, reflection, constructivist criticism, selection and information analysis (Grodecka, Wild, & Kieslinger, 2009). While working in groups online, learners gain knowledge and build their skills based on peer-to-peer networks and share experience with others. Although several studies have evaluated the relationship between collaboration learning factors and e-learning experience, very few have examined learners' learning quality in relation to Web 3.0 courses. In addition, not many teachers bring Web 3.0 technologies into their classrooms as Gersten (2013) states "many educators are doing Education 1.0; talking about doing Education 2.0; when they should be planning and implementing Education 3.0" (p. 1). The evaluation of quality of learning experience would thus appear to determine whether mobile assisted social e-learning is suitable that can respond to students' needs and enrich their learning.

2. THEORETICAL BACKGROUND

2.1 Collaboration Learning Theory

According to Bruner (1987), learning is an activity process in which learners acquire new knowledge based on their prior knowledge that had been developed by experiences. Therefore, the social constructivism turns the focus to the importance of the learners rather than instructors. In addition, instructional methods have been shifted to a variety of student-oriented approaches that engage student work together in groups (Bauersfeld, 1995; Effandi & Zanaton, 2007; Kan, 2011). Learners benefit most from actively engaging in learning activities through social interaction with the immediate learning environment (Vygotsky, 1978, Woo & Reeves, 2008). They are encouraged to discover their own solutions and try out ideas and hypotheses. The instructor's primary

role is to assist the students' learning process as a facilitator so that students can exercise their capabilities in knowledge formation (Doolittle & Hicks, 2003).

Most social constructivism models stress the need for collaboration among learners. Studies (Hassan, Fong, & Idrus, 2011; Minocha, 2009) state that applications of social software technology support and increase students' engagement and enrich the learning process. Studies (Nam & Zellner, 2011; Tsay & Brady, 2010) also show that students improve their academic achievement through collaborative tools. In addition, results from Johnson and Johnson (1975) study reported positive outcomes from cooperative learning including increasing higher level reasoning, increasing generation of new ideas and solutions, and enhancing transferring of learning between situations. Johnson et al. (1991) further state that collaborative learning is different from having students work in groups, instead, it is to be structured and managed cooperation among groups. Five essential components in small-group collaborative learning include positive interdependence, face-to-face promotive interaction, individual and group accountability, group processing, and social skills (Johnson & Johnson, 1994).

2.2 Collaboration Learning Process

Feedback is a critical part in collaboration learning process in online or traditional classroom. Based on the core concept of socio-cultural theory, reflection is formed through the process of social interaction and semiotic mediation (Vygotsky, 1978; Wells, 1999). Feedback measuring to what extent learning outcomes have been achieved embeds potential impacts on learning (Gayton, 2005; Hounsell, 2007). The feedback can motivate students by providing positive reinforcement, help students to correct their performance by identifying where could be improved, and inform educators to measure effectiveness of teaching (Yorke, 2003). It fosters motivation, improves self-esteem (Nicol & MacFarlane-Dick, 2006; Sadler, 1989), empowers students as self-regulated learners (Nicol, 2010), and impacts general academic experience (Gielen et al., 2010; Shute, 2008). Timing is also important. Feedback should be provided promptly as needed as Brinko (1993) from social cultural theory suggested. Furthermore, social constructivists suggest that feedback should be given frequently (Gielen et al., 2010) and constantly (Pokomy & Pickford, 2010).

In collaboration projects, perceived ability and learning goals are positively correlated with each other. For example, an individual student's contribution might impact students' level of self-value for the learning output in a collaborative activity (Kirschner et al., 2006). Perceived quality and perceived learning may impact group collaborative learning process in an online environment (Caspi & Blau, 2008; Guo & Stevens, 2011).

2.3 Quality of Learning Experience

Quality of experience particularly with the cooperative learning activities has been conceptualized in several different ways, including satisfaction (Strokes, 2003), engagement (Chickering & Gamson, 1987; McGowan & Graham, 2009), self-regulation and positive affect (Kempler, Linnenbrink, Zusho, & Maehr, 2002), and feedback (Chickering and Gamson, 1987; Zerihun, Beishuizen, & Os 2012). When students are engaged in a quality experience, they increase their level of enjoyment, happiness, self-esteems, concentration, strength, and intrinsic motivation (Covington, 2000; Csikszentmihalyi & Schneider, 2000; Libert, 2010).

3. RESEARCH METHODOLOGY

3.1 Purpose of the Study and Research Questions

This study sought to promote an interactive mobile assisted social e-learning (iMASE) module as an alternative avenue for improving learning quality of fostering collaboration among students themselves and between students and instructors and enhancing learning satisfaction. The purpose of this study was to access students' experiences and perceptions of the emergence used of mobile apps as part of educational and social interaction tool and better understand what students like/dislike about using mobile apps in learning. In addition, student grades were examined as a desired outcome factor as the result of the evaluation of the proposed iMASE module. The following research questions were examined: the first 3 questions were closed questions followed by two open-ended questions.

1. Does the iMASE module effectively help the participants learn the content in an iMASE module in this course?
2. What is the relationship between learners' quality of learning experience and the online collaboration factors?
3. How much of the variance in quality of learning experience can be explained by the significantly correlated online collaboration factors?
4. What are student attitudes toward working in an iMASE module?
    - 4.1. What do you like most about the iMASE module in this course?
    - 4.2. What do you dislike most about the iMASE module in this course?

3.2 Interactive Mobile Assisted E-Learning Module (iMASE)

This course integrated with the assisted mobile techs led the students into such a social learning environment, called iMASE module in this study (Figure 1). Obviously, all the social networking Web apps were interchangeable. Students selected the app(s) they felt best suited to their needs.

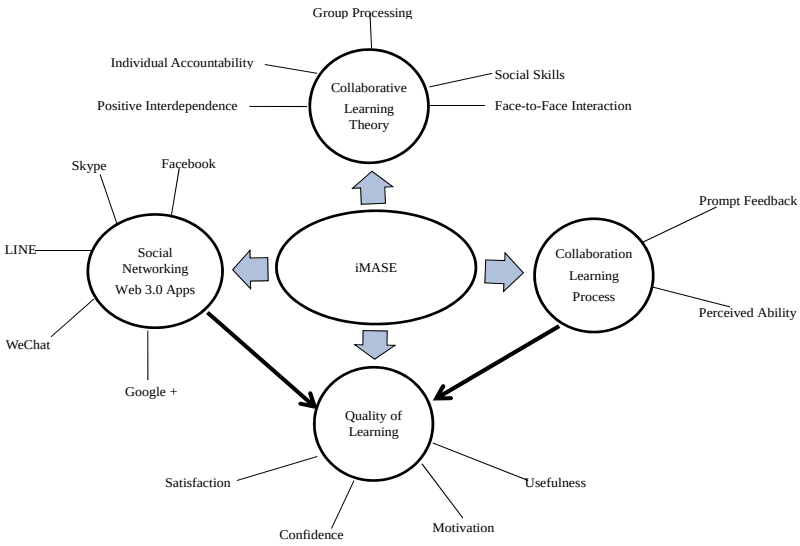

Figure 1: Interactive mobile assisted social e-learning module

3.3 Profile of Participants

Convenient purposeful sampling procedures were used. The sample included 55 undergraduate enrolled in a speech and debate course with 52 return at National Formosa University, Taiwan. Males (22%) and females (78%) with a mean age of 22 years were all full-time students. The study was conducted during regular class periods.

3.4 Procedure

Students participated in the module activities including online discussion, processes of peer feedback or instructor feedback, collaborative group projects via mobile apps. At the beginning of the study, a private Facebook group was established for this particular class. During the second week of the study, the participants were introduced to a variety of mobile apps which most of the students have been used, including Facebook, LINE, WeChat, Skype, and Google+ Hangouts. To ensure everyone knows how to use each of the apps, one-hour training session was given. During the training session every of the students was invited to the private Facebook page of this particular class that the instructor created before the class started. In addition everyone formed his/her own group, set up a private group under each app, tested file uploading, and exchanged information through different mobile apps. Every student also added the instructor to her/his contact in all suggested mobile apps. Every student was informed to have an opportunity to contact with the instructor and peers using any of the mobile apps at their convenience between classes. Students were encouraged to use Facebook for assignment file uploading, Skype and Google+ Hangout for oral presentation and teleconferencing, LINE, and WeChat for audio communication, and Facebook, LINE and WeChat for Q & A and announcements among the group members.

Under the group function of mobile apps, each group member accessed to apps for sending or receiving message, posting or linking resources, and uploading and sharing files as part of assignment delivery methods. Each group (size of 4-5) worked on projects altogether, providing feedback to and received feedbacks from peers constantly on the apps. After that, the drafts were uploaded and posted on class Facebook page where everyone in the class could be able to download and view. Each group revised and improved their projects based on the feedback they received from the instructor and/or from other groups' members. Within an 18-week study, the students completed two group projects and received the review scores given by the instructor alongside the average review score given by the rest of the class. During the study, 3 exams regarding the course content and lesson materials were conducted in hard copy in class in week 6, 12, and 18. Each exam contained less than 50 questions comprised of a combination of multiple-choice, Tue/False, and complete sentence types of questions.

Students completed a survey voluntarily at the end of the module. The student attitudes and quality of teamwork learning experience were printed on a 3-page survey. Data were collected during the final week of an 18-week long semester. The questionnaire was also available through the apps in case any student was absent during the survey distribution class section. It took an average 20 minutes to complete and all participants completed the surveys.

3.5 Data Collection (instrument, questionnaire)

A self-report questionnaire that measured the quality of learning experience of the course was used. The questionnaire consisted of 3 major parts, including a portion for the participants' demographics, a quantitative portion of the learning module aspects, and a qualitative portion that asking participants overall comments. The second portion of the quantitative assessment was consisted of 33 scale responses covering 7 factors of collaborative learning and 1 learning quality scale as shows as follows. All scale responses are measured via a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

(1) positive interdependence, PI (4 items, e.g.: "I felt recognized for what I know"; "I felt recognized for what I need to learn");
(2) individual accountability, IA (3 items, e.g.: "Using mobile apps increased my ability to learn from others"; "I felt working with other more easily using the mobile apps");
(3) group processing, GP (3 items, e.g.: "achieving the group goals through the online apps"; "encouraged the group learning");
(4) social skills, SS (3 items, e.g.: "effectively work with diversity via communication management"; "contributed more to class discussion through the mobile apps";
(5) face-to-face interaction, FF (3 items, e.g.: "prefer face-to-face with my instructors"; "would be happier doing this course without any technology");
(6) prompt feedback, PF (2 items, e.g.: "always get a prompt feedback from my instructor"; "like the feedback on my work that I received from my classmates");
(7) perceived ability, PA (2 items, e.g.: "believed my efforts benefited my group toward to the group project"; "my efforts helped my group reach the goal");
(8) learning quality (13 items from 4 subscales including usefulness, confidence, motivation, and satisfaction).

With regard to the qualitative aspects, the following 2 items were listed for collecting students' overall comments. These 2 open-ended questions guided the researchers to what they need to know most, insights into the effectiveness and ineffectualness of the module.

(1) What did you like most about the iMASE module in this course?
(2) What did you dislike most about the iMASE module in this course?

Once the initial questionnaire was developed, the content validity was yield through an interactive personal interview process with e-learn experts, instructors, and students from mixed learning courses. After proofread, when necessary, revised descriptions for clarity and completeness, the survey instrument were then printed. Internal consistency reliability using Cronbach's α was conducted on the overall 33 items and on the each of the factors. Results indicated that the internal reliability for the overall scale was good; Cronbach's α= .85. Alpha coefficients for the factor IA (.90), FF (.90), PF (.85), and learning quality (.83) were found to be high, apart for the GP (.64), PI (.62), PA (.46), and SS (.34).

4. ANANYSIS AND RESULTS

The collected data consisted of a review of the student academic examination results in the learning contents. In addition, gathered from participants' responses to the survey. Quantitative data (closed-ended questions) and qualitative (open-ended questions) from the survey were analyzed using statistical analysis and a grounded theory method described in the following sections.

4.1 Descriptive Statistics

A majority (79%) of the respondents had 3-4 years of Facebook experience (mean= 3.39, SD= .11). One-third (38%) of them reported that they had 1-2 year of LINE experience (mean= .99, SD= .12). Almost everyone (98%) of them reported that they had less than a year of WeChat (mean=.64, SD= .04) and Hangouts experience (mean=.41, SD= .00) prior to the class. Most (82%) of the respondents reported that they used smart phones to access data while only a few students accessed data through their iPod touch (7%), and tablet (9%). The most popular place where students used mobile apps was home, with 75% accessing data frequently. Many (76%) of the respondents also reported that they used mobile apps outside classroom at campus frequently. Similarly, more than half (69%) of the respondents reported that they used mobile apps during commuting to and from school. The least popular place was shopping stores or restaurants. Among the key applications, respondents

had more friends on Facebook (mean= 503.78, SD= 57.49) than they do on LINE (mean= 53.91, SD= 7.75), WeChat (mean=35.11, SD= 8.45) and Hangouts (mean= .70). Regarding the frequency of mobile apps usage, Facebook was used frequently by most the students (95%). More than half of the respondents (60%) used LINE frequently. WeChat (14%) and Skype (27%) were the least used in their daily lives.

4.2 Research Question 1(closed-ended question): Evaluation of the iMASE Module

The learning assessments that participants carried out during the activities were evaluated. The following means of the three exams were found as follows. With the total score of each exam 100, the first exam scored 73.85, the second scored 82.45. At the end of module, all students completed the final exam: the mean was 80.92 out of 100. The results indicate that the module was successful.

4.3 Quantitative Research Question 2 (closed-ended question): Collaboration Factors

Research question two examined whether quality of teamwork learning experience is related to the online collaboration factors. The results revealed that five collaboration factors were positively correlated with each other and all five collaboration factors were significantly correlated with quality of learning experience. The highest correlation was found between IA and PA (r= .76), followed by GP and SS (r= .51) and IA and SS (r= .45). In addition, the highest correlation was found between quality of teamwork learning experience and SS (r= .59), followed by quality of teamwork learning experience and IA (r= .49), quality of teamwork learning experience and PF (r= .44). Table 1 illustrates the bivariate correlations between quality of teamwork learning experience and the online collaboration factors.

Table 1. Intercorrelations of the collaboration factors with quality of teamwork learning

Factors	IA	GP	SS	PF	PA
IA	--				
GP	.22				
SS	.45**	.51**			
PF	.29*	.28*	.25		
PA	.76**	.13	.27	.17	
Quality of Teamwork	.49**	.43**	.59**	.44**	.32*

*p< .05; **p< .01

The findings were coherent with Buraphadeja & Kumnuanta (2011) who indicate that interaction between students in online learning environments provides an affective support for a sense of connectedness. To better understand the student attitudes toward online collaboration, each statement on the survey was examined. The mean scores and standard deviations of 7 factors of collaboration scale were ranked in Table 2. In terms of collaboration learning, the overall mean score across the 7 factors was 3.88, indicating positive agreement regarding their experience about class learning process. The top-ranked factor on the scale was PI (mean= 4.72), while the SS (3.50) was rated the lowest (mean= 3.50). The two highest-rated statements on the survey were "I felt recognized for what I know." (mean= 4.80) and "I felt recognized for what I need to learn." (mean= 4.77). On the other hand, the two lowest-rated statements were "I shared personal information through the mobile apps." (mean= 3.45) and "My team members shared their cultural information through the mobile apps." (mean= 3.50).

Table 2. Collaborative learning scale scores

Rank	Factors	Mean	SD
1	PI	4.72	.39
2	PF	4.36	.75
3	PA	3.66	.92
4	GP	3.65	.71
5	IA	3.63	.60
6	FF	3.61	.71
7	SS	3.50	.71
Overall		3.88	.68

4.4 Quantitative Research Question 3 (closed-ended question): Quality of Learning Experience

Hierarchical regression analysis was conducted to answer research question 3, exploring the explanation of quality of teamwork learning experience through the online collaboration factors. The results revealed that 5 extracted significant collaboration factors (IA, GP, SS, PF, and PA) contributed significantly to the explanation of quality of teamwork learning experience and accounted for 68% of the variance, $F(5, 50)= 22.04$, $p< .001$,

effect size (f^2)= .71, indicating that the linear combination of all 5 variables significantly accounted for variance in the dependent variable.

In addition, particularly, results showed that IA (β= .26, p< .05) significantly predicted quality of teamwork learning experience, as did SS (β= .40, p< .001), PF (β= .55, p< .001), and PA (β= .46, p< .05). Table 3 shows the summary of regression analysis for variables explanation quality of teamwork learning experience.

Table 3. Hierarchical regression analysis summary for variables predicting quality of learning experience (N= 52)

Variable	B	SEB	β
PI (positive interdependence)	.11	.19	.07
IA (individual accountability)	.28	.14	.26*
GP (group processing)	.15	.12	.17
SS (social skills)	.36	.13	.40**
FF (face-to-face interaction)	.08	.11	.10
PF (prompt feedback)	.44	.10	.55**
PA (perceived ability)	.31	.14	.46*

*p< .05; **p< .001

The mean scores and standard deviations of the subscales of learning quality scale were ranked in Table 4. The overall mean score across the 4 learning quality subscale was 3.74, indicating positive agreement about their quality of learning in a collaborative online activity. The highest-rated subscale on the survey was confidence (mean= 4.28). In contrast, the lowest-rated one was satisfaction (mean= 3.20). To better understand how students perceived their learning quality, each item on the survey was examined. The highest-rated statements on the survey was "I felt confident using the mobile apps on this course" in subscale confidence (mean= 4.29), and "Overall, I felt this experience in this course was useful" in subscale usefulness (mean= 4.08). On the other hand, the lowest-rated statements on the survey was "I felt excited using the mobile apps on this course" in subscale motivation (mean= 3.45) and "Overall, I'm very satisfied using Google+ Hangouts for my group project" in subscale satisfaction (mean= 3.00).

Table 4. Learning quality scale

Rank	Subscale	Mean	SD
1	Confidence	4.28	.92
2	Usefulness	3.83	.76
3	Motivation	3.64	.85
4	Satisfaction	3.20	1.20
Overall		3.74	.88

4.5 Qualitative Research Questions 4 (open-ended question)

When students were invited to provide comments for what they liked or disliked about the learning module on this course, they listed a wide range of comments as the qualitative data for this study. Glaser and Strauss' (1967) grounded theory was followed as a method for coding the qualitative data. Grounded theory method is the most powerful qualitative method in the social sciences. As defined by Glaser (1978), grounded theory methodology explicitly involves "generating theory and doing social research (as) two parts of the same process" (p. 2). The key idea of this method is to discover a phenomenon by conceptualizing and categorizing the key elements of the phenomenon, and then generating and forming a theoretical explanation of that phenomenon (Strauss and Corbin, 1990). Thus, the researcher analyzed and categorized the similar data from the open-ended questions into different phenomenological themes.

After carefully read the answers several times, 192 and 47 discernibly different answers were scanned and coded for the positive and negative aspects respectively. The answers were then categorized into different themes as reported in Figure 2 (positive aspects) and Figure 3 (negative aspects). In the phenomenological process, five themes emerged which were interpreted by the researcher as: peer interaction, motivation, computer skills, prompt feedback, and relationship with teacher for the positive aspects; four themes emerged which were interpreted by the researcher as: peer interaction, motivation, computer skills, and privacy for the negative aspects. In the categorization process, the similar answers were sorted together and 15 categories formed for the positive aspects (Table 5) and 10 for the negative aspects (Table 6). There were nine missing answers for the negative aspects and many short answers from the participants when asked what they disliked about it. For this reason, there were less answers and categories for the negative aspects. Table 3 and Table 4 also described the frequency of these answers mentioned by each participant.

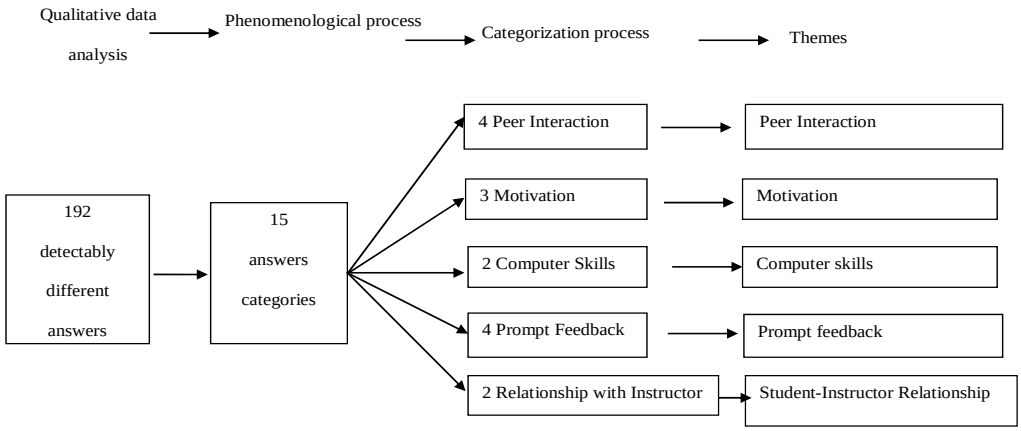

Figure 2. Diagram of the ground theory of analysis for the qualitative part of the positive aspects of the learning module

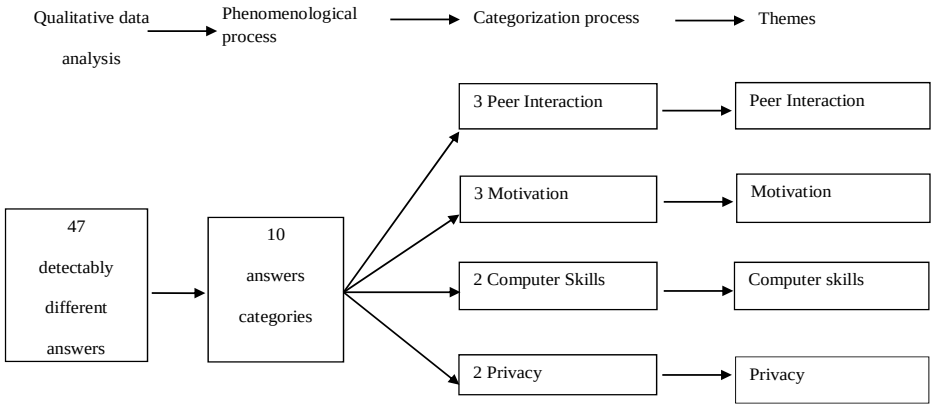

Figure 3. Diagram of the ground theory of analysis for the qualitative part of the negative aspects of the learning module

Table 5. Qualitative data of the positive aspects of quality of teamwork in iMASE activities

	Category	Participant	Frequency %	Total %	Theme
1.	Interacting	4	2.08	42.71%	Peer Interaction
2.	Information sharing	35	18.23		
3.	Project collaborating	30	15.63		
4.	Interpersonal relations	13	6.77		
5.	Useful	9	4.69	12.50%	Motivation
6.	Cares from others	7	3.64		
7.	Self-esteem	8	4.17		
8.	Free calls	22	11.46	17.19%	Computer Skills
9.	Stickers sharing	11	5.73		
10.	Productivity	17	8.85	21.35%	Prompt Feedback
11.	Peer feedback	7	3.65		
12.	Teacher feedback	9	4.68		
13.	Punctuality	8	4.17		
14.	Link with teacher	7	3.65	6.25%	Student-Teacher
15.	Appointment making	5	2.60		Relationship

Table 6. Qualitative data of the negative aspects of quality of teamwork in iMASE activities

	Category	Participant	Frequency %	Total %	Theme
1.	Different levels of engagement	3	6.38	44.68%	Peer Interaction
2.	No common agreement	4	8.51		
3.	Too much time spent on social	14	29.79		
4.	No confidence in communication	2	4.26	12.77%	Motivation

5.	Lack of mutual motive	2	4.26		
6.	No respect	2	4.26		
7.	Difficulties of setting up groups on apps	2	4.26	6.38%	Computer Skills
8.	No tutor teaching apps	1	2.13		
9.	Lack of privacy	15	31.91	36.17%	Privacy
10.	More spam	2	4.26		

Positive comments from students

In the qualitative section of survey, when asked about what students liked most in an iMASE module, their comments include (1) peer support, (2) instructor encouragement, (2) self-esteem, (3) clear communication, (4) prompt feedback from both peers and instructor, (5) high frequency of communication, (6) use of free VoIP calls over the Internet, and (7) information and resources sharing. Obviously, participants enjoyed working together with a group, sharing with opinions and experiences through the communication on mobile apps. For example, S3 commented, "I can hand in a decent quality of homework while working in a group. My group members always help to correct and check before we hand in our assignment"; S24 also stated, "communicating with others while working in groups help me to think more broadly"; S38 reported, "It's more efficient working with my classmates than by myself". More importantly, many participants (S7, S11, S18, S40) reported that they felt great when their ideas helped contribute to the group's shared goal. In addition, positive relationship between student and instructor was also built in online collaborative activities. Interestingly, participants stated that in this learning module, they could get to know their instructor and build a positive link which they never thought about to get such close to a college professor in reality. For example, S5 said, "I've never imaging that I can chat with my professor on Facebook"; S8 mentioned, "having a conversation with my professor on LINE is just so cool".

Mobile apps provide immediacy and one-on-one contact in an active learning cycle. Students appreciated for the prompt feedback they received both from their peers and instructor. S2, and 15 others delivered their greatfulness to their peers and instructor for solving their problem immediately. Twenty-one students stated that they can use free voice call feature on Facebook, LINE or WeChat which save a lot on phone bills. Among the positive aspects from the qualitative data, regarding the seen feature of the apps in Facebook and LINE, the participants stated that they can be able to track whether their peer(s) have read that message or not, which left their peers(s) no excuse for not attending the meeting or any missing tasks. S18 reported, "with the seen feature, it's more convenient to arrange a group meeting". Similarly, S29 stated, "… now no one can have an excuse saying that they did not see the meeting announcement".

Negative comments from students

In contrast, when asked about what students disliked most about the iMASE module, their comments included (1) lack of common agreement, (2) different levels of participations, (3) much time spent on social, (4) lack of respect from their peers, (5) technical problems, and (6) lack of privacy. Some students (S28, S31, S43) commented working in groups just gave some particular people a free ride, similarly, some other students (S37, S41) reported that it took too much time to achieve a common goal. While mobile apps give people power to share and keep each other connected, they can turn themselves from a helpful tool to a time waster. Students (S9, S21) mentioned that they waste a lot of time on unnecessary conversation with their peers on LINE. Besides, S14 and S47 commented that they spend too much time on surfing Facebook. Student 6 commented, "I'm addicted to texting and surfing my friends' status on Facebook. I cannot help myself to get away from it. I have to check it so many times a day which really wastes a lot of my time". Furthermore, regarding the seen feature, a lot of students (S1, S25, S36, S38, S21) complained that Facebook and LINE's seen feature dropped them in trouble when they were trying to ignore someone and he/she knows about it.

5. DISCUSSIONS AND CONCLUSION

The current research provided the participants perspectives of an iMASE module, proposing collaborative activities in an online mobile e-learning environment. The overall results indicated that the participants improved their learning achievement through a high frequency of communication with peers and instructor in an iMASE module which support findings of previous study of Tsay and Brady (2010). Based on this current research, 5 collaboration factors should be simultaneously considered in the development of current e-learning system: individual accountability, group processing, social skills, prompt feedback, and perceived ability. Results indicated that students' sense of community and connectedness in the learning environments enhanced their learning which provided positive supports for previous study (Buraphadeja & Kumnuanta, 2011). In addition, the sense of own value to the learning community created an important characteristic link to the perception of the learning experience. Specifically, individual accountability (as students feel their efforts can help their group achieve their common goal), as well as social skills (as student feel they are able to enhance

their interpersonal communication skills) provided the best explanation to predict the quality of learning experience. These two variables accounted for a 38% of the variance. The results were consistent with the previous studies that technology-based learning environments play an important role in supporting social skills (Hassan, Fong, & Idrus, 2011; Minocha, 2009; Woo & Reeves, 2008) and individual accountability (Caspi & Blau, 2008; Guo & Stevens, 2011; Resta & De Hoyos, 2005). In fact, the results also indicated that in addition to individual accountability, students also needed to perceive that they were competent to their group. That is, because Web social setting where students' abilities can be recognized and their beliefs about their self-worth can be promoted. This finding supported self-worth motivation theory (Covington, 2000; Csikszentmihalyi & Schneider, 2000), in which the degree of self-worth learners possess motivate learners to do well and success on tasks at hand.

Learning is a social activity (Chen & Bryer, 2012; Grodecka, Wild, & Kieslinger, 2009; Vygotsky, 1978) and interaction is the primary element in social activity as the process of learning (Woo & Reeves, 2008). The true alternative for foster interaction with others in the class is a small class lecture. The Web 3.0 has afforded individuals the opportunity to connect and communicate at almost no cost at anywhere and anytime (Borovik, 2011; Libert, 2010). The results from qualitative data also indicated that they indeed liked the prompt feedback they received from the peers and instructor which was also consistent to the results from quantitative data. The results indicated that the quality of students' learning experiences could be predicted by the quality of feedback students gave and received. This finding corroborated the previous study (Gaytan, 2005) which indicated that "immediate, ongoing, and detail-oriented feedback assists students in better understanding the material and more effectively applying what they have learned" (p28). Feedback should be given frequently as Brinko (1993) from social constructivism suggested.

The results of this study aligned with other studies conducted in online collaborative environments (Buraphadeja & Kumnuanta, 2011; Nam & Zellner, 2011). The results of the current study also corresponded to conclusion by other researchers that the social skills (Chickering & Gamson, 1987; McGowan & Graham, 2009) and motivation (Csikszentmihalyi & Schneider, 2000) were significant factors to predict quality of learning in technology-mediated instruction. Furthermore, the qualitative data revealed that students liked the information sharing and the collaboration in group-projects via mobile apps. This finding was in concert with previous studies (Caspi & Blau, 2008; Guo & Stevens, 2011; Resta & De Hoyos, 2005), which advocated that students' information sharing influences their perceived quality of learning outcomes. One negative aspect from the qualitative data to be noted for further course design was the privacy of the Web. Participants reported a lot about their privacy concern about the processes experienced during the use of mobile online activities.

Evaluating the learning module in this study was undoubtedly useful, but complex. While some participants felt the seen feature in Facebook and LINE was useful, some felt this seen feature put them in a no privacy box. The participants often mentioned being seen as situation of negative aspects of Facebook and LINE. Actually, the seen feature can be removed, but obviously, the students did not know how. If this is the primary reason for the students as a privacy concern, it is likely to be solved easily and efficiently. Therefore, the researchers can decide whether to release this knowledge ahead of the study for future research.

As a result of this study, mobile social networking apps in collaborative learning appear valued by students. Results suggest that e-cooperative learning with mobile networking apps promoted a social constructivist learning environment in which makes the need for the newly acquired knowledge evident and perceived as useful to the students. Apart from learning, they developed their technology skills and confidence in the usage of multimedia and Web apps that is one of the important elements in this 21st century learning environment.

5.1 Limitations

While this study provides importance guidance toward a more holistic framework for the integration of collaborative activities in a mobile assisted learning environment that is based on constructivism knowledge, it must be noted that this study is just one preliminary investigation. All students voluntarily completed the survey were enrolled in the same class, so the students represent a distinct population within the university. As such, the sample was very homogeneous and may not be representative of all the university students. To be able to extract further, similar studies need to be done in different classes across semesters or academic years and across different colleges/universities involving different demographics. Another limitation is the instructor's computer skills and characteristics. The high level of degree instructor involved with the students after school hours may be the major cause for strengthening the link between students and instructor. The instructor's passionate and high abilities in designing a set of mobile learning activities may be the cause for fostering learning engagement and enhancing learning engagement.

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